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10/501,837	11/16/2004	Paul R. Aimone	Mo-7306/NRC-P74	6922
23416 7590 12/01/2008 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER				
MAL, NGOC LAN THI				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

## Application No.

10/501,837

## Applicant(s)

AIMONE ET AL.

## Examiner

NGOCLAN T. MAI

## Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 9-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1-8 are currently under examination, wherein claim 1 is amended in applicant's amendment filed on 8/15/08. Claims 9-16 are have been elected without traverse and are withdrawn from consideration.

### ***Status of Previous Rejection***

2. The previous rejections to claims 1-8 is withdrawn in light of applicant's statement that the instant application 10/501,837 and Published Application US 2002/0112955 were commonly own by H.C. Stark, Inc. at the time the invention of application 10/501,837 was made.
3. Upon further consideration and search, the claims are rejected under 35USC 103(a) based on Pratt, US. Pat. No. 5,038,014.
4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1-4, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pratt et al (U.S. Patent No. 5,038,014).

Pratt collectively discloses a method for fabrication and repairing articles comprising loading powder metal particles into a hopper **40** for feeding into a laser additive chamber (column 7, lines 65-66 and Figure 6), loading a substrate **12** into the laser additive chamber (column 7, lines 49-52, Figure 6), feeding the powder metal powders **24** into the additive chamber onto successive points on the substrate in linear trace (column 6, lines 34-35), melting the substrate and the powder with the laser beam **60** (column 6, lines 35-39, column 8, lines 38-

49) and building up multiple coating of a controlled microstructure, tracing the substrate over a selected area with a combined deposition and melt beam and building up a coating of a controlled microstructure in multiple layers and building up a deposit from the coating and forming a refractory metal part (column 6, line 48 to column 7, line 3). Pratt teaches virtually any shape can be made by the process. For typical aircraft engine application Pratt teaches tubes and boxes, (column 3, lines 32-35) which broadly encompass tube preform. Pratt teaches the powder used includes titanium alloy as the refractory metal. See col. 4, lines 20-21 and Example 1. While Pratt does not specifically teach making refractory metal part which is tube preform, however employing the method of Pratt to form refractory part having such shape would have been obvious since Pratt teaches his method can used employing refractory metal and for any shape.

Concerning claim 2, the coating would inherently be fully dense since it is formed by the same method as the applicant.

Concerning claims 3 and 4, Pratt teaches the process is carried out under argon atmosphere (Example 1), which appears to be at atmospheric pressure since Pratt does not discloses any applied pressure or lack of pressure.

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pratt et al (U.S. Patent No. 5,038,014) in view of Brown (U.S. Patent No. 4,323,756, art of record).

Pratt differs from the claims in that Pratt does not teach the process is carried out under hard vacuum (recited in claim 5) and the laser beam generates sufficiently high heat to create conditions that purify the powder and the refractory part (recited in claim 6).

As for the utilization of laser beam that generates high heat, Brown teaches a method for fabricating articles by sequential layer deposition of powder on a substrate wherein the substrate is melted to a depth greater than the thickness of the applied feedstock layer. See col. 4, line 65 to col. 5, line 5. Brown also teaches the multiple melting permits some material purification since some impurities may be vaporized, ensuring the production of a pore free structure, providing perfect metallurgical bonding between deposited layers and promoting continuity of grain structure, i.e., epitaxial growth from one layer to the next. See col. 5, lines 7-12. It would have been obvious to one skill in the art that the substrate and therefore the powder of Pratt be melted by the laser beam with energy sufficient to vaporize impurities for the improvement noted by Brown.

As for the utilization of hard vacuum, Brown also teaches process condition can be carried out either by inert gas or vacuum. It would have been obvious to one skilled in the art to substitute the inert gas in the process of Pratt with a vacuum since either one can be successfully used in laser melting process as taught by Brown.

7. Claims 1, 2, 3-4, and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wollenberg (DE 199 25 330 A1 ) in view Pratt et al. (U.S. Patent No. 5,038,014).

Concerning claims 1, 7 and 8, Wollenberg teach a sputter target production or recycling comprising covering a cast plate (3) or worn target region pieces with target material pieces or melt and then supplying heat from an IR emitter (2) which is passed over the target material (1) to effect complete melting and then solidification of the target material. (See Abstract; Figures 1

and 2). In Figure 2 the target 1 is attached to a backing plate 3 with IR emitter 2 supplying the heat to recycle the target material. The IR emitter is believed to encompass IR emitters such as infrared lasers.

The differences between Wollenberg and the present claims are that utilizing metal powder particles loaded in a hopper for feeding the powder for melting for recycling is not discussed, utilizing a laser beam is not discussed, and building up a coating in multiple layers is not discussed.

As to the utilization of a metal powder since Wollenberg broadly disclose filling the worn target region with metal pieces, it is believed that metal pieces would serve as powder the purpose of filling the worn target region during the recycling process. See Wollenberg et al., discussed above.

As to the utilization of a laser beam it is believed that an IR heater encompasses an infrared laser beam heating device.

As to powder loaded in the hopper for feeding the powder into a laser chamber and the building up a coating in multiple layers, Pratt et al a process repairing articles comprising loading powder metal particles into a hopper **40** for feeding into a laser additive chamber (column 7, lines 65-66 and Figure 6), loading a substrate **12** into the laser additive chamber (column 7, lines 49-52, Figure 6), feeding the powder metal powders **24** into the additive chamber onto successive points on the substrate in linear trace (column 6, lines 34-35), melting the substrate and the powder with the laser beam **60** (column 6, lines 35-39, column 8, lines 38-49) and building up multiple coating of a controlled microstructure, tracing the substrate over a selected

area with a combined deposition and melt beam and building up a coating of a controlled microstructure in multiple layers and building up a deposit from the coating and forming metal part (column 6, line 48 to column 7, line 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilizing the process of repairing article and apparatus for carried such process taught by Pratt in order to carry out the repairing or recycling the sputtering target of by Wollenberg. Furthermore utilizing multiple layers would not be a patentable difference since it would be an obvious modification to increase the layering in order to form coating having a desired thickness. Hence the difference would appears to no more than routine optimization of thickness layering which is well within the skill if the artisan and productive of no new and unexpected results.

Concerning claim 2, the making of refractory metal part taught by Wollenberg in view of Pratt would inherently produce a coating that is fully dense since it is formed by the same method as the applicant.

Concerning claims 3 and 4, Pratt teaches the process is carried out under argon atmosphere (Example 1), which appears to be at atmospheric pressure since Pratt does not discloses any applied pressure or lack of pressure. Utilizing atmosphere taught by Pratt in the method of Wollenberg for the same purpose would have been obvious to one skilled in the art.

8. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wollenberg in view of Pratt et al (U.S. Patent No. 5,038,014) as applied to claim 1 above and further view of Brown (U.S. Patent No. 4,323,756, art of record).

Wollenberg in view of Pratt differs from the claims in that the process, which is carried out under hard vacuum (recited in claim 5) and the laser beam generates sufficiently high heat to create conditions that purify the powder and the refractory part (recited in claim 6) are not discussed.

As for the laser beam being sufficient high to create the claimed conditions, Brown teaches a method for fabricating articles by sequential layer deposition of powder on a substrate wherein the substrate is melted to a depth greater than the thickness of the applied feedstock layer. See col. 4, line 65 to col. 5, line 5. Brown also teaches the multiple melting permits some material purification since some impurities may be vaporized, ensuring the production of a pore free structure, providing perfect metallurgical bonding between deposited layers and promoting continuity of grain structure, i.e., epitaxial growth from one layer to the next. See col. 5, lines 7-12. It would have been obvious to one skill in the art that the substrate and therefore the powder of Wollenberg in view of Pratt be melted by the laser beam which generates sufficient high heat to vaporize impurities for the improvement noted by Brown.

As for the utilization hard vacuum, Brown also teaches process condition can be carried out either by inert gas or vacuum. It would have been obvious to one skilled in the art to substitute the inert gas in the process of Wollenberg in view of Pratt with a vacuum since either one can be successfully used in laser melting process as taught by Brown.

#### ***Response to Arguments***

9. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection. See above rejections.



10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NGOCLAN T. MAI whose telephone number is (571)272-1246. The examiner can normally be reached on 8:30-5:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art Unit  
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n.m.